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A tailored strategy for designing the WALK-Copenhagen intervention to increase mobility in hospitalized elderly medical patients: a protocol for the qualitative part of the WALK-Copenhagen project

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1 A tailored strategy for designing the WALK-Copenhagen
2 intervention to increase mobility in hospitalized elderly medical
3 patients: a protocol for the qualitative part of the WALK-
4 Copenhagen project

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25 **Keywords:** Study protocol, elderly medical patient, mobility, qualitative methods, critical
26 realism, implementation.

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28 **ABSTRACT**

29 **Introduction** Elderly medical patients (>65 years) represent 54% of the admissions to Danish
30 medical and emergency departments. Acute admissions and bed rest during hospitalization are
31 independent risk factors for death and dependency in elderly patients. Even short hospitalizations
32 are associated with increased dependency in activities of daily living after discharge. Interventions
33 that reduce low mobility during hospitalization are therefore important. The aim of this article is to
34 describe the design of the intervention in the WALK-Copenhagen project, which aims to increase
35 the 24-hour mobility in older medical patients during acute hospitalizations and after discharge.

36 **Methods and analysis** This study is based on ethnographic fieldwork and interviews. Workshops
37 will be used to develop and co-design the intervention in collaboration with key stakeholders
38 (patients, relatives, health professionals and researchers). Cultural learning processes, the theory of
39 common knowledge and cultural historical activity theory will be used to help us understand the
40 collaboration between health professionals, structures and artefacts, in relation to mobility in the
41 medical departments.

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4 42 **Ethics and dissemination** The project adheres to the directives of the Helsinki Declaration. Ethical
5
6 43 approval was not required for the study because formal ethical approval is not mandatory for studies
7
8 44 that do not involve biomedical issues according to Danish law. Informed consent was obtained from
9
10 45 all participants. The results will be disseminated to health professionals, managers, patients and
11
12 46 relatives, who will be invited to afternoon meetings where the project will be discussed. The results
13
14 47 will be published in peer-reviewed scientific journals and presented at scientific conferences.
15
16

17 48 **Strengths and limitations of this study**

- 19
20 49 • Research shows that it is challenging to achieve increased mobility during hospitalization in
21
22 50 elderly patients and many barriers to achieving increased mobility behaviour have been
23
24 51 identified.
- 25
26 52 • Interventions that increase mobility during hospitalization are important.
- 27
28 53 • User engagement is not common when designing interventions even though research has shown
29
30 54 that an intervention that is developed from a user perspective and is adapted to the local context
31
32 55 is more likely to be successful.
- 33
34 56 • In this study, the intervention is tailored to the local context by developing and co-designing the
35
36 57 intervention in collaboration with key stakeholders such as patients, relatives, health care
37
38 58 practitioners and researchers, according to the BMJ campaign “Partnering with patients”
39
40 59 (http://www.bmj.com/company/qip_examples/partnering-with-patients/)
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45 60 • The intervention design is based on findings from a series of qualitative studies because these
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47 61 methods are well suited for providing in-depth relational knowledge for designing the most
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49 62 appropriate patient intervention.
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63 INTRODUCTION

64 It is well recognized that complete bed rest and physical inactivity in hospitalized patients
65 can have serious health consequences.[1] This knowledge is not new, but physical inactivity in
66 hospital settings still remains a challenge. Older medical patients (aged 65 years or more) represent
67 54% of the annual admissions to Danish medical and emergency departments.[2] Acute admissions
68 and bed rest during hospitalization are independent risk factors for death and dependency in older
69 patients,[3-5] and even short hospital stays are associated with increased dependency in activities of
70 daily living after discharge.[5, 7] A previous Danish study showed that older medical patients who
71 walked independently (with or without walking aids) at admission spent a median of 17 hours a day
72 in bed and walked less than 1 hour a day during hospitalization.[8] This low level of mobility
73 during hospitalization in older medical patients poses a high risk of self-reported functional
74 decline.[9] Studies of older medical patients have shown that patients who lose functional capacity
75 during hospitalization have reduced ability to recover the lost function.[5, 10] Accordingly, many
76 older medical patients experience sustained functional limitations after hospitalization, placing them
77 at increased risk of further functional decline, which can lead to dependency in activities of daily
78 living, increased fall episodes and mortality.[5, 7, 11]

79 Interventions that improve mobility during hospitalization are therefore important.
80 However, research has shown that it is a challenge to achieve increased mobility during
81 hospitalization in older patients.[4] Studies report several reasons for these difficulties: lack of
82 space, medical equipment restricting out of bed mobility, lack of assistive devices and help from
83 staff, lack of patient motivation, patient weakness and pain, and different views on health
84 professionals' roles concerning the task of mobilizing patients.[12]

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4 85 Being mobile is complex and influenced by environmental factors (such as weather
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6 86 conditions and access to infrastructure), internal factors (such as level of motivation, fear of falling),
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8 87 and social support (by peers or family).[13] Systematic reviews investigating determinants for
9
10 88 increased mobility in older people have shown that older people believe that increased mobility can
11
12 89 improve physical and mental well-being.[14, 15] However, many barriers to achieving increased
13
14 90 mobility behaviour have been identified, such as lack of knowledge about the importance of
15
16 91 mobility, insufficient social support, negative attitudes towards mobility, competing priorities,
17
18 92 unfavourable beliefs and various personality traits.[14, 15]

22 93 Addressing mobility is considered to be a core task for physiotherapists working with older
23
24 94 hospitalized patients.[16] However, the complexity of physiotherapy practice has increased as a
25
26 95 result of changes in health care, for example, high patient turnover places higher demands on
27
28 96 physiotherapists to ensure effective management of patients.[17] Thus, time and temporality
29
30 97 become barriers to continuously support the mobility of older medical patients during
31
32 98 hospitalization.

36 99 In most Danish hospitals, physiotherapists are not part of the permanent staff employed in
37
38 100 the medical departments. Therefore, the physiotherapists only visit these departments in the daytime
39
40 101 to carry out tasks related to the mobility of referred patients. Thus, surveillance of ongoing mobility
41
42 102 in hospitalized patients tends to be lowered after the physiotherapist has left the department.[4, 12,
43
44 103 18] Hence, nurses hold a key position in supporting mobility in older patients. However, nurses do
45
46 104 not consider mobility a prioritized nursing care activity[19] or part of their core tasks.[12]
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48 105 Numerous barriers to nurses and physicians' efforts to improve mobility in patients have been
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50 106 identified.[4] These include concerns about mobility-related falls or fall injuries and doubts
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52 107 regarding the patients' motivation for mobility during acute illness. Thus, nurses and physicians do
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4 108 not encourage older medical patients to be mobile.[4] At the organizational level, the barriers
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6 109 include lack of staff and time.[12] Thus, based on different professional perspectives and priorities,
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8 110 there seems to be a paradox regarding mobility of older medical patient: physiotherapists perceive
9
10 111 improved mobility as an important task to prevent functional decline, but nurses and other health
11
12 112 professionals, who spend the most time with patients, do not consider patient mobility a core task
13
14 113 and tend to focus on medical procedures and patient flow.[20] Hence, patient mobility is dependent
15
16 114 on several factors, such as the efforts and beliefs of more than one group of health professionals,
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18 115 and on complex factors such as patients' knowledge, motivation and attitude.

22 116 Consequently, interventions that take the multiple barriers to older patients' mobility into
23
24 117 account are needed. An intervention that is developed from a user perspective and is adapted to the
25
26 118 local context is more likely to be successful.[21] A growing body of evidence shows that patient
27
28 119 engagement can yield better health outcomes,[22] contribute to improvements in health care quality
29
30 120 and patient safety,[23] and lead to research findings that are more pertinent to the users' concerns
31
32 121 and dilemmas.[21] Nevertheless, user engagement is not common at the design phase of
33
34 122 interventions. Instead, an intervention is typically designed on the basis of the literature, and only
35
36 123 rarely incorporates knowledge, skills and experiences from, for example, health professionals.[24]

40 124 The aim of this protocol paper is to describe the intervention design of WALK-Copenhagen
41
42 125 (WALK-Cph), a mixed-methods clinical project aimed at increasing mobility in older medical
43
44 126 patients during acute hospitalizations and after discharge. The qualitative part of the study began in
45
46 127 January 2017. The intervention design is based on a series of qualitative studies that are outlined
47
48 128 below. A schematic presentation of the whole WALK-Cph project is provided in figure 1.

129 **PHILOSOPHY OF SCIENCE**

130 WALK-Cph is inspired by a critical realistic approach that focuses our attention on the
131 search for generative mechanisms that explain the social world. Realism as a philosophy of science
132 is situated between the extremes of positivism and relativism[25] and acknowledges that the world
133 is an open system with structures and layers that interact to form mechanisms and contexts. Thus,
134 we are interested in (1) identifying, analysing and understanding the social world of health
135 professionals regarding mobilization of older medical patients and (2) health professionals’
136 responses to different resources offered within new interventions. The focus is on understanding the
137 complicated layers that exist below the surface and explaining health professionals’ reasoning in
138 their actions and reactions. Ontologically, critical realism builds on the assumption that features that
139 form our world are not essentially visible and that reality exists independently of what is perceived.
140 [25]

141 In a critical realistic view, the world, i.e. in this study the medical departments, is divided
142 into three domains: (1) the empirical domain (events and phenomena that can be perceived
143 objectively); (2) the actual domain (events and phenomena that take place regardless of whether
144 they can be perceived or not, but which are affecting the empirical domain); and (3) the real domain
145 (structures and generative mechanisms, for example, power, political decisions, and relationships).
146 Thus, reality is layered like an iceberg extending beneath the surface where it is not visible to the
147 eye. In a critical realistic approach, science is about exploring the third domain, the real domain. It
148 is about going from experiencing a phenomenon and what is immediately perceived to
149 understanding and explaining which structures and mechanisms create the phenomenon. However,
150 interdependency exists, which means that our interpretation of the real world influences our actions,
151 which in turn can influence reality.[25]

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4 152 Adopting a critical realism position allows us to focus on the interaction between actors and
5
6 153 structures over time. A realistic methodology consists of a number of phases. In connection with
7
8 154 mobility of older medical patients, the first phase will be to clarify the purpose of the research to
9
10 155 understand what constitutes mobility of older medical patients. Second, empirical data on the
11
12 156 phenomenon, i.e. mobility (movement sensor data, field study and barrier screening) will be
13
14 157 collected. The third step will be to abduct the structures, the potential forces as well as the
15
16 158 mechanisms that tend to trigger the forces of the inherent phenomenon (i.e. mobility). Abduction, in
17
18 159 the sense of this protocol, means creating new concepts, hypotheses, models or theories about
19
20 160 mobility that are not known in advance. In this process, the three domains will be combined.
21
22 161 Finally, the preliminary new knowledge will be presented at workshops for health professionals and
23
24 162 other researchers as a verification process. If the participants can associate with the new concepts,
25
26 163 models or hypotheses, a sound basis for the new knowledge to be used in practice will have been
27
28 164 created. In a classic critical realistic research process, this approach is quite linear, but in this
29
30 165 project, the process will appear cyclically, to further support the possibilities for implementation.
31
32 166 [36]

167 **The concept of mobility**

168 In WALK-Cph, mobility is defined in accordance with Satariano et al.,[26] who state that
169 mobility refers to “Movement in all of its forms, including basic ambulation, transferring from a
170 bed to a chair, walking for leisure and the completion of daily tasks, engaging in activities
171 associated with work and play, exercising, driving a car, and using various forms of public
172 transport.” In addition, our definition of mobility includes mobilization, as many activities in and
173 around patients in a medical department also relate to passive transfer. Therefore, in WALK-Cph,
174 mobility refers to situations where the individual is actively involved in movement and situations
175 where the individual is passively moved, for example, moved around in the bed.

176 **STUDY DESIGN**

177 The WALK-Cph is a pragmatic cross-sectoral and mixed-methods project with the overall
178 aim of increasing 24-hour mobility in older patients during acute hospitalization and after discharge.
179 The primary outcome for the WALK-Cph study is increased mobility and will be estimated as steps,
180 transitions, or upright time, based on thigh-worn accelerometry using activPAL3 activity monitors
181 (PAL Technologies Ltd., Glasgow, UK). Whether the primary outcome will be expressed as steps,
182 transitions, or upright time depends on the initial pilot and feasibility testing of the intervention, the
183 outcomes and other trial procedures (study 2a and 2c, figure 1) to help qualify the randomized
184 controlled trial (RCT; study 3a, figure 1) of the WALK-Cph project. The intervention is based on an
185 assumption that by tailoring the intervention to the local context, the likelihood of successful
186 implementation will increase.[21,27] This will be done by developing and co-designing the
187 intervention in collaboration with key stakeholders such as patients, relatives, health professionals
188 and researchers, in accordance with the BMJ campaign “Partnering with patients”
189 (http://www.bmj.com/company/qip_examples/partnering-with-patients/). A tailored intervention is
190 defined as an intervention in which the identification of barriers has been undertaken before the
191 design and delivery of the intervention. [21]

192 The design of the intervention was inspired by the Medical Research Council (MRC)
193 framework for the development and evaluation of complex interventions to improve health.[24]
194 However, instead of first conducting an intervention study to ascertain clinical effectiveness and
195 then considering implementation, WALK-Cph is designed both as an intervention and an
196 implementation study, a so-called hybrid design.[28] This means that the implementation study is
197 planned from the outset. Hybrid design has been advocated to improve the speed of generating new
198 knowledge and to increase the benefit and uptake of clinical research. [28]

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4 199 In four studies, we will design (phase 1), fidelity test (phase 2), impact test (phase 3) and
5
6 200 measure adoption (phase 4) of the intervention (figure 1). After an initial observational study, the
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8 201 health professionals from two intervention departments will be asked to participate in workshops
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10 202 and focus group interviews during the full study period (figure 1).
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13 203 In order to achieve the overall project aim, the following research questions will be
14
15 204 addressed in the qualitative studies of WALK-Cph:
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- 18 205 1. What current cultural practices exist for mobility of older medical patients in the medical
19
20 206 departments?
21
22 207 2. What are the roles of different professional cultures both regarding mobility of older patients
23
24 208 and regarding collaboration between different professional groups to achieve increased mobility
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26 209 in older patients during and after hospitalization?
27
28 210 3. How can we develop a patient intervention that is tailored to local cultural practices and based
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30 211 on a high degree of user engagement by health professionals, patients and their relatives?
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32 212 4. How does a tailored patient intervention influence the extent to which health professionals and
33
34 213 patients adhere to recommendations for managing increased mobility in older patients during
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36 214 and after hospitalization?
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41 215 **Study setting**

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43 216 WALK-Cph will be carried out in Denmark where the health care system is public funded
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45 217 by tax payers. The Danish welfare state provides free treatment for primary medical care, hospitals,
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47 218 and home-based care services for all citizens. WALK-Cph will be conducted at four medical
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49 219 departments in three public hospitals in the capital region of Copenhagen, Denmark. In addition,
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51 220 physical therapy departments, a municipality and a municipality-based rehabilitation centre will
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53 221 participate.
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4 222 WALK-Cph will use a purposeful sampling approach[29] to reflect the diversity in medical
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6 223 specialties and to obtain rich information concerning the mobility practice for medical patients. We
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8 224 will select departments that reflect many facets of the medical specialty rather than focusing on one
9
10 225 specialty. We will include medical departments where older medical patients are admitted and
11
12 226 where increased mobility is expected to be one of the core tasks of care and treatment. Four
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14 227 different departments will be chosen to participate: (1) a department of endocrinology; (2) a
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16 228 department of infectious and pulmonary diseases; (3) a department of gastroenterology; and (4) a
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18 229 general medical department. Each chosen department will have between 18 and 40 beds with
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20 230 similar numbers and proportions of physicians, registered nurses and certified nursing assistants. In
21
22 231 all hospitals, the physical therapy service is centrally organized to service all wards.
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232 **METHODS AND ANALYSES**

233 The qualitative methods will include an ethnographic field study, participant observation,
234 interviews and workshops. These methods have been chosen because they are well suited for
235 providing in-depth relational knowledge for designing an appropriate patient intervention.[30]
236 Furthermore, qualitative methods are also appropriate to obtain knowledge about the contextual
237 circumstances with regard to the implementation, delivery and evaluation of an intervention. By
238 using qualitative methods, we will be able to account for the context in which events occur and
239 uncover social patterns; for example, which relationships are important for actions related to
240 mobility and for interventions that increase mobility. Qualitative methods are also valuable for
241 exploring the underlying assumptions in relation to the designed intervention and identifying the so-
242 called active ingredients of a complex intervention [24] required to achieve increased mobility.
243 Finally, qualitative studies make it possible to determine which groups of participants are most
244 likely to respond positively to the designed intervention, whether the intervention must be modified
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4 245 in different ways for different groups or departments, or whether it should not be used at all for
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6 246 certain groups of people.[31,32]
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9 247 **Ethnographic field study**

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11 248 The design phase (figure 1) will begin with an ethnographic field study, including
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13 249 participant observation.[33-36] Our position will primarily be as observers rather than
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15 250 participants.[35]. The field study will enable us to generate rich descriptions of the interactions
16
17 251 between health professionals and patients and explore the importance of contextual factors,
18
19 252 professional identities and professional boundaries for mobility of older medical patients in the
20
21 253 departments. This is crucial because observational knowledge relating to mobility of older medical
22
23 254 patients in the departments is sparse. By being physically present in the department, taking part in
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25 255 and observing the health professionals carrying out their daily activities, we will be able to
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27 256 understand how mobility of older patients is practiced in the departments and how it is perceived by
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29 257 different participants.[31]
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34 258 We have chosen a focused observation strategy,[29, 36] whereby we will follow the health
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36 259 professionals (physiotherapists, nurses, nursing assistants and physicians) in their daily work with a
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38 260 particular focus on language, actions and materialities regarding mobility of patients. We will
39
40 261 inquire into what is being done and into arguments for decisions that the health professionals make
41
42 262 about mobility in concrete situations.
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46 263 The observations will be carried out by the researchers, two of whom are trained nurses
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48 264 (MSN) and two are trained physiotherapists (MHSc). By choosing researchers with different
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50 265 professional backgrounds, we acknowledge that the ability to gather data and generate knowledge
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52 266 depends on the position of the researcher. [35] However, we anticipate that by comparing our
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54 267 observations, we will become aware of our own positions and perspectives and how they frame our
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4 268 observations. Thus, by cross-checking and discussing our observations, we can sharpen our
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6 269 attention on differences of significance for data generation. This process will take place
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8 270 continuously during meetings after each observation period to cross-check data and interpretations
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10 271 and will strengthen the validity of the results. [31] By systematizing the observations and creating
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12 272 transparency, the observations will have credibility [33, 35] and allow us to explore and understand
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14 273 how health professionals make decisions about mobility in interactions with the patients and each
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16 274 other.

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20 275 We will use an observation guide to record activities and interactions. Field notes will
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22 276 consist of both non-verbal and verbal observations such as body language, dialogue between the
23
24 277 health professionals and patients, and the use of material artefacts such as mobility aids. Dialogues
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26 278 will be written down as close to verbatim as possible.[31]

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29 279 The observation guide will also include descriptive data (e.g. sex, profession and
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31 280 professional experience) and questions like “Who initiated mobility?”, “What arguments are raised
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33 281 when patients’ needs for mobility are rejected or accepted?”, “Is any kind of material artefact used,
34
35 282 such as a walker or a screening tool?” According to Mason,[32] field notes should also include
36
37 283 focus areas of “subjective capabilities”. The intention is that the researcher writes down reflections
38
39 284 on his or her own actions, attitudes, location and presence. This increases the understanding of how
40
41 285 the researchers affect the relations, underscoring that neutrality and detachment in relation to data
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43 286 collection, analysis and interpretation is impossible.

44 45 46 47 48 287 **Analytical perspective**

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50 288 We will analyse our observational data using different theories: cultural learning processes,
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52 289 the theory of common knowledge and cultural historical activity theory.[37-42] These theories can
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54 290 help us understand contradictions and transformations in the collaborations among the health
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4 291 professionals, structures and artefacts, and how cultural processes that create ideas about how
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6 292 culturally experienced participants,[39], for example, the nurses, should interpret and act in relation
7
8 293 to mobility in a particular cultural world (in the department).
9

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11 294 WALK-Cph derives its concept of culture from the theories of cultural learning processes
12
13 295 that understand culture not only as a homogeneous set of assumptions, attitudes and values that all
14
15 296 health professionals possess.[43-45] Rather, culture is understood as something the health
16
17 297 professionals produce in order to create links and connections between materialities and meanings
18
19 298 in social and physical spaces.[37] This means that culture does not refer to cognitive processes only;
20
21 299 culture is also enacted and has bodily elements embedded. This concept of culture is relevant when
22
23 300 we use observational studies, where we can observe how the health professionals act, what they say,
24
25 301 what materialities they include and exclude in their professional practice, and how they move in
26
27 302 physical rooms. In this perspective, the concept of culture focuses on both what is homogeneous
28
29 303 and what is different, for example, between professions.[38]
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34 304 Data from the ethnographic field study will be analysed using both a thematic analysis and a
35
36 305 deductive approach where we analyse the material from the perspective of different theoretical
37
38 306 concepts, for example, as cultural models,[37] common knowledge[40] and activity systems.[41]
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41 307 The results from the analysis will be presented and used as mirror data in the subsequent
42
43 308 workshop (figure 1). Mirror data are defined as data representing the present state of work practices,
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45 309 providing the health professionals with a mirror reflection of their activities by presenting examples
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47 310 of current practice.[42]
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311 **The workshops**

312 After the field study, four workshops, each lasting four hours, will be used to develop the
313 WALK-Cph intervention in collaboration with health professionals, patients, relatives and
314 researchers. In the workshops, we will get an opportunity to bring together different forms of
315 evidence-based knowledge, both theoretical and empirical, to accommodate increased mobility of
316 older medical patients.[41] The workshop method has been chosen because implementation
317 research points to the importance of involving the people who are responsible for increasing the
318 mobility of older medical patients, in this case the health professionals.[46] Each workshop will be
319 held in a classroom in the hospital and will be video- and audiotaped. The design phase consists of
320 three workshops.

321 Workshop I: health professionals

322 Health professionals from the intervention departments and the municipality will participate.
323 The aim of this workshop is to develop a catalogue of initiatives that the health professionals
324 believe will increase the mobility of older medical patients. The catalogue will be based on the
325 health professional's knowledge, experience and attitudes as well as observational data from the
326 field study. The proposed initiatives will form the basis for the development of the intervention.

327 Workshop II: patients and relatives

328 Patients and their relatives will participate. Workshop II has two aims: (1) to generate a
329 catalogue of initiatives that the patients and the relatives believe will increase mobility based on
330 their knowledge, experience, attitudes and mirror data; (2) to obtain feedback from the patients and
331 their relatives on the catalogue of initiatives suggested by the health professionals at workshop I.
332 The initiatives suggested by patients and relatives will also contribute to the development of the
333 intervention. The results from workshop II will have as much weight as the results from workshop I.

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4 334 Workshop III: health professionals

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6 335 Health professionals will participate and be introduced to the patients' and the relatives'
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8 336 proposals. The particular aim of workshop III will be to finalize a prototype of the intervention. A
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10 337 study focusing on facilitators and barriers (barrier screening) will then be performed and the
11
12 338 intervention will be adjusted according to these results before being tested in a feasibility study
13
14 339 (study 2, figure 1). After the design phase, one more workshop will take place.

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17 340 Workshop IV: health professionals, patients and relatives.

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19 341 Health professionals, patients and relatives will participate to provide feedback. Workshop
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21 342 IV will take place after the fidelity study (figure 1) and the aim will be to inform the health
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23 343 professionals, the patients and the relatives about which parts of the intervention were feasible in
24
25 344 clinical practice and which aspects might need to be adapted, and also to receive feedback from
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27 345 health professionals, patients and relatives. The final intervention will then be adapted and designed
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29 346 before testing in an RCT.

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33 347 Between the different workshops, the research team will work systematically to develop the
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35 348 intervention. The study follows Rothman and Edwin's[27] proposed five-phase model for design of
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37 349 interventions: (1) problem analysis and project planning, (2) information gathering and synthesis,
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39 350 (3) design, (4) pilot testing and (5) evaluation. As a part of the workshops and the barrier screening,
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41 351 input from health professionals, patients and relatives will be collected and the research team will
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43 352 score the feasibility of all incoming input based on a number of criteria: rationality, complexity,
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45 353 compliance with rules and regulations, required time, economic neutrality, accessibility of
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47 354 equipment and amelioration of patient life quality. Inspired by the Delfi method,[47] all input will
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49 355 be scored between 1 and 5, where 1 represents low complexity and 5 represents high complexity.
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51 356 All interventions that have a median score equal to or less than 2 will be included in the final
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4 357 intervention. The intervention model will be presented at workshops II–IV, where input from the
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6 358 participants will serve to modify the design of the intervention into a final version.
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9 359 **The participants**

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11 360 The participants in workshops II and IV will include 8–10 older medical patients (>65
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13 361 years) who have been admitted to a medical department and 8–10 relatives who have had a relative,
14
15 362 friend or family member (>65 years) admitted to a medical department. The participants in
16
17 363 workshops I, III, IV and IV will include physicians, nurses and nursing assistants, physiotherapists,
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19 364 occupational therapists and leaders affiliated with the two intervention departments or the
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21 365 municipalities. The health professionals will be selected by their managers and will be selected
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23 366 based on profession, experience in the medical or physiotherapy department and being responsible
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25 367 for implementing the intervention. The selection is also inspired by Roger's five categories of
26
27 368 users.[48] The five categories range from enthusiastic people who are good at initiating and
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29 369 managing interventions, even beyond their own department, to those who have a strong voice
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31 370 within the department and finally, those with the greatest resistance towards the intervention. This
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33 371 complexity of participants ensures a multi-voiceness perspective [41] on both possibilities and
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35 372 barriers in relation to designing an intervention that has the ability to match the local context. This
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37 373 selection will be performed in collaboration with the first-line managers from the departments.
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43 374 **Barrier screening**

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45 375 Barrier screening designed as semi-structured individual interviews with health
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47 376 professionals will be carried out in the two intervention departments, the physiotherapy departments
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49 377 and the municipalities after the intervention has been designed. The aim of barrier screening is to
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51 378 explore and understand the health professionals' perceived barriers and facilitators regarding the
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53 379 intervention, once it has been designed (figure 1). Barrier screening will complement the field
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4 380 studies at the organizational level and the workshop at the group level. Twenty interviews will be
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6 381 conducted with health professionals from the medical intervention departments who have not
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8 382 participated in the workshops. Barrier screening will support and ensure that the intervention is
9
10 383 based on opinions, attitudes and perspectives from health professionals and positions other than
11
12 384 those who participate in the workshops. Both contradictory and complementary views are relevant
13
14 385 for identifying patterns in the participants' understanding, practices and how they relate to situations
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16 386 involving mobility of older medical patients.

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20 387 Barrier screening will be designed and analysed based on the Theoretical Domain
21
22 388 Framework (TDF) [49,50] and Rogers' framework of innovation attributes. [48] The purpose of the
23
24 389 TDF is to identify determinants at an individual level. TDF includes 128 constructs in 12 domains
25
26 390 derived from 33 theories of social-cognitive behaviour change. Rogers' innovation attributes
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28 391 concern a number of perceived characteristics of innovations, which influence their adoption and
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30 392 use, including an innovation's relative advantage compared with routine practice, compatibility
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32 393 with the pre-existing system, complexity, trialability or testability, potential for reinvention and
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34 394 observed effects. Interventions that do not meet these criteria tend to be difficult to disseminate and
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36 395 implement.

396 **ETHICS AND DISSEMINATION**

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398 Before undertaking observations, interviews and workshops, all participants will be
399 informed about the aim of the study. They will be assured that participation is voluntary and that the
400 results will be anonymous. All participants will be asked to provide written, voluntary and informed
401 consent before participation in the workshops and interviews. Anonymity will be ensured by
402 assigning participants a code instead of using their full names in field notes and interviews. Only
persons who are part of the research team will have access to data. The project will adhere to the

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4 403 directives of the Helsinki Declaration.[51] Ethical approval was not required for the study because
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6 404 formal ethical approval is not mandatory for studies that do not involve biomedical issues (I-Suite
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8 405 no. 05078) according to Danish law.
9

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11 406 After completing the study, the results will be disseminated to all the health professionals,
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13 407 managers, patients and relatives. They will be invited to afternoon meetings where the findings, the
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15 408 process and cooperation will be the focus. The results from this study will be published in peer-
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17 409 reviewed scientific journals and presented at one or more scientific conferences.
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21 410 **Summary**

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24 411 This protocol paper describes the WALK-Cph project, which is aimed at developing and
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26 412 implementing an intervention to increase mobility in older medical patients during acute
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28 413 hospitalizations and after discharge. Few previous studies have reported on the contribution of
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30 414 qualitative research to select, design and model interventions.[24] WALK-Cph is being designed on
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32 415 the premise that an intervention that is developed with contributions from the perspective of the
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34 416 users and is adapted to the local context is more likely to be implemented.[21] Therefore, the
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36 417 WALK-Cph intervention will be developed in collaboration with patients, relatives, researchers and
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38 418 health professionals. This collaboration makes it possible to use different experiences, skills,
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40 419 knowledge and expertise in the study while recognizing that the participants' local knowledge
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42 420 improves the external validity of the intervention.[27] We therefore believe that the WALK-Cph
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44 421 study can make valuable methodological contributions to intervention research.
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427 JWK led the study, and drafted the manuscript in collaboration with ACB, TT-T, PN, MMP.
428 TB, RSH, OA, JP, LK extensively revised the manuscript. All authors have approved the final
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433 **Competing interests**

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435 **Provenance and peer review**

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553 **Figure 1.** WALK-Cph intervention and implementation activities (contents covered by the present
 554 protocol are in red).

	Phase 1: Design		Phase 2: Fidelity		Phase 3: Intervention	Phase 4: Adoption
WALK-Cph intervention grant number [00013449]	Collaborative design of intervention (Study 1a)		Fidelity of intervention (Study 2a)	Redesign of intervention (Study 2c)	Effect of intervention (Study 3a)	
	Practice observation study: Observations of everyday practice to understand the context Intervention design study: Workshops I+I+III with users and researchers to design the intervention Intervention determinant study: Focus group interviews to identify barriers and facilitators for the planned intervention		Observational study to measure the fidelity of the intervention	Workshop IV with users and researchers for further development and refinement of the intervention	Randomized Controlled Trial: To measure the effect of the invention Fidelity of intervention: Observations to assess delivery of intervention	
WALK-Cph implementation grant number [00017276]		Design and development of the implementation strategy to support the intervention (Study 1b)	Fidelity of the implementation strategies (Study 2b)	Redesign of the implementation strategies (Study 2d)	Fidelity of the implementation strategies (Study 3b)	Adoption study (Study 4)
		Implementation strategy design study: Workshop with users (managers and key implementation staff) and researchers to identify, select and monitor relevant implementation strategies.	Observational study to measure the fidelity of the implementation strategies.	Workshop with users (managers and key implementation staff) and researchers to redesign and monitor relevant implementation strategies based on the fidelity study and workshops.	(in case of redesign following 2d) Observational study to measure fidelity	Observations of everyday practice and comparison with initial observations and semi-structured interviews.

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BMJ Open

A TAILORED STRATEGY FOR DESIGNING THE WALK-Copenhagen (WALK-Cph) INTERVENTION TO INCREASE MOBILITY IN HOSPITALIZED OLDER MEDICAL PATIENTS: A PROTOCOL FOR THE QUALITATIVE PART OF THE WALK-Cph PROJECT.

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Primary Subject Heading:	Qualitative research
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Keywords:	Elderly medical patients, critical realism, implementation, study protocol

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A TAILORED STRATEGY FOR DESIGNING THE WALK-Copenhagen (WALK-Cph) INTERVENTION TO INCREASE MOBILITY IN HOSPITALIZED OLDER MEDICAL PATIENTS: A PROTOCOL FOR THE QUALITATIVE PART OF THE WALK-Cph PROJECT.

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Key words: Study protocol, elderly medical patient, mobility, qualitative methods, critical realisme

ABSTRACT

Introduction

Older medical patients (>65 years) represent 54% of the admissions to Danish medical- and emergency departments (EDs). Acute admissions and bed rest during hospitalization are independent risk factors for death and dependency in older patients. Even short hospitalizations are associated with increased dependency in activities of daily living after discharge. Interventions that increase mobility during hospitalization are therefore important. The purpose of this protocol is to describe the intervention design of the WALK-Copenhagen project, aimed at increasing 24-hour mobility in older medical patients during acute hospitalizations and following discharge.

Methods and analysis

This study is based on ethnographic fieldwork and interviews. Workshops are used to develop and co-design the intervention in collaboration with key stakeholders (patients, relatives, health professionals and researchers). Cultural learning processes, the theory of common knowledge and the cultural historical activity theory will be used to help us understand the interaction between the health professionals, structures and artefacts, in relation to mobility in the medical departments.

Ethics and dissemination

The project will adhere to the directives of the Helsinki Declaration. Ethical approval was not required for the study since formal ethical approval is not mandatory for studies that do not involve biomedical issues according to Danish law. Informed consent was obtained for all participants. The results will be disseminated to health professionals, managers, patients and relatives, who will be invited to afternoon meetings where the project will be discussed. The results will be published in peer-reviewed scientific journals and presented at scientific conferences.

Word count; 249

STRENGTHS AND LIMITATION

- The external validity, i.e. generalizability of study findings, may be compromised since the results cannot be directly transferred to hospital settings elsewhere
- A strength of the study is the use of multidisciplinary teams, as it provides different perspectives on the multidimensional issue under study
- A strength of the study is the use of theoretical frameworks as it enhances the ability to understand and explain how and why certain results are achieved.

INTRODUCTION

It has been known for a long time that complete bed rest and low mobility in hospitalized patients can have serious health consequences (1). Nonetheless, and for a number of different reasons, today's hospitalized patients are very immobile (2). In older medical patients (aged 65 years or more), acute admissions and bed rest during hospitalization are independent risk factors for death and dependency (3,4) and even short hospitalizations are associated with increased dependency in activities of daily living after discharge (5). Hence, interventions to increase mobility in older patients during hospitalization are greatly needed to avoid serious health consequences after hospitalization, such as increased dependency.

Older people admitted acutely to hospital for medical reasons represent 54% of the annual admissions to Danish Medical- and Emergency Departments (EDs) (6). These older medical patients demonstrate a very low level of mobility during hospitalization (7,8). We recently reported the degree of low mobility in these patients to amount to a median of 17 hours a day in bed and less than one hour of walking a day during hospitalization (7). To make these numbers even more alarming is the fact that all patients walked independently (with or without walking aids) at admission (7). This low level of mobility during hospitalization in older medical patients poses a high risk of self-reported functional decline (9,10). Patients, who lose functional capacity during hospitalization have reduced ability to recover the lost function (4,9). Accordingly, many older medical patients will experience sustained functional limitations after hospitalization, placing them at increased risk of further functional decline, which can lead to dependency in activities of daily

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4 living institutionalization and death (10,11). Interventions that improve mobility during
5 hospitalization are therefore important.
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7 Despite great knowledge of the importance of increased mobility to counteract functional decline in
8 older medical patients, it has proven to be difficult to achieve (2). The reported difficulties include:
9 lack of space and staff, medical equipment restricting out of the bed mobility, lack of assistive
10 devices and help from staff, lack of patient motivation, patient weakness and pain and different
11 views on the health professionals' roles concerning the task of mobilizing patients (2,12,13).
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13 Physiotherapists who work with older medical patients consider mobility to be a core task (13).
14 However, the complexity of physiotherapy practice has increased due to changes in health care, e.g.
15 a high patient turnover which places higher demands on physiotherapists to ensure effective
16 management of patients (14). Thus, time and temporality become determinants to continuously
17 support mobility of older medical patients during hospitalization. Hence, patient mobility is
18 supported by nurses, who hold a key position in supporting mobility in older patients. However,
19 nurses do not consider mobility as a part of their core tasks (15). Numerous determinants to nurses
20 and physicians' efforts to improve mobility in patients have been identified (2). These include
21 concerns about mobility related falls and doubts regarding the patients' motivation for mobility
22 during acute illness. Thus, nurses and physicians do not encourage older medical patients to be
23 mobilized (2). Based on different professional perspectives and priorities, there seems to be a
24 paradox regarding older medical patients' mobility: physiotherapists perceive mobility as an
25 important task to prevent functional decline, but nurses and other health professionals, who spend
26 the most time with patients, do not consider patient mobility a core task and tend to focus on
27 medical procedures and patient flow (16,17). Hence, patient mobility is dependent on several
28 factors such as the efforts and beliefs of more than one group of health professionals and also on
29 complex factors such as patients' knowledge, motivations and attitudes.
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35 To consider the determinants of mobility reviewed above – and to facilitate intervention uptake and
36 clinical implementation – there is a need for developing an intervention that takes the multiple
37 determinants of older patients' mobility into account. An intervention that is developed from a user
38 perspective and is adapted to the local context is more likely to be successful (18). A growing body
39 of evidence shows that patient engagement can yield better health outcomes (19), contribute to
40 improvements in health care quality and patient safety (20) and lead to research findings that are
41 more pertinent to the users' concerns and dilemmas (18). Nevertheless, user engagement is not
42 common at the design phase of interventions. Instead, an intervention is typically designed on the
43 basis of the literature, only rarely incorporating knowledge, skills and experiences from, for
44 example, health professionals (21). The WALK-Cph intervention will be developed in collaboration
45 between patients, relatives, researchers and health professionals. This collaboration makes it
46 possible to use different experiences, skills, knowledge and expertise in the study while recognizing
47 that the participants' local knowledge improves the external validity of the intervention. We
48 therefore believe that the WALK-Cph study can make valuable methodological contributions to
49 intervention research.
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Thus, the aim of this protocol paper is to describe the intervention design of WALK-Cph, which is a mixed-methods clinical project aimed at developing and implementing an intervention to increase mobility in older medical patients during acute hospitalizations and following discharge. The qualitative part of the study started in January 2017 and will end by 1st of August 2018. The intervention design is based on a series of qualitative studies that are outlined below (Figure 1).

METHODS AND ANALYSES

Philosophy of science

WALK-Cph is inspired by a critical realistic approach that focuses on the search for generative mechanisms that explain the social world. Realism as a philosophy of science is situated between the extremes of positivism and relativism (22) and acknowledges that the world is an open system with structures and layers that interact to form mechanisms and contexts. Thus, we are interested in: 1) identifying, analyzing and understanding the social world of the health professionals regarding mobilization of older medical patients and 2) the health professionals' responses to different resources offered within new interventions. The focus is on understanding how the interaction between visible and non-visible features forms the health practitioners' actions, reactions and way of thinking, both individually and collectively. (23).

In a critical realistic view, the world, i.e. in this study the medical departments, is divided into three domains: 1) the empirical domain (events and phenomena that can be perceived objectively); 2) the actual domain (events and phenomena that take place regardless of whether they can be perceived or not, but which are affecting the empirical domain); and 3) the real domain (structures and generative mechanisms, e.g. power, political decisions, and relationships). Thus, reality is layered like an iceberg extending beneath the surface where it is not visible to the eye. In a critical realistic approach, science is about exploring the third domain, the real domain. It is about going from experiencing a phenomenon and what is immediately perceived, to understanding and explaining which structures and mechanisms create the phenomenon (22).

Adopting a critical realism position will allow us to focus on the interaction between actors and structures over time. A realistic methodology consists of different phases. The first phase will be to clarify what constitutes mobility of older medical patients. Secondly, empirical data on the phenomenon, i.e. mobility (movement sensor data and data from field study and barrier screening), will be collected. The third step will be to create new concepts, hypotheses, models or theories about mobility (abduction). This preliminary new knowledge will be presented in workshops for the health professionals and other researchers as a verification process. If the workshop participants can associate with the new concepts, models or hypotheses, a sound basis for the new knowledge to be used in practice has been created (24).

Mobility

In WALK-Cph, mobility is defined in accordance with Satariano et al (2012, p.1508), who state that

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4 mobility refers to “Movement in all of its forms, including basic ambulation, transferring from a
5 bed to a chair, walking for leisure and the completion of daily tasks, engaging in activities
6 associated with work and play, exercising, driving a car, and using various forms of public
7 transport”(25). In addition, our definition of mobility includes mobilization, as many activities in
8 and around patients in a medical department also relate to passive transferring. Therefore, in
9 WALK-Cph mobility refers to situations where the individual is actively involved in movement and
10 situations where the individual is passively moved, e.g. moved around in the bed.
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13 **Study design**

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15 WALK-Cph is a pragmatic cross-sectoral and mixed-methods project with the overall aim of
16 increasing 24-hour mobility in older patients during acute hospitalization and following discharge.
17 The primary outcome for the WALK-Cph study is increased mobility and will be estimated as steps,
18 transitions, or upright time, based on thigh-worn accelerometry using activPAL3™ activity
19 monitors (PAL Technologies Ltd., Glasgow, UK). Whether the primary outcome will be expressed
20 as steps, transitions, or upright time depends on initial pilot and feasibility testing of the
21 intervention, the outcomes and other trial procedures (study 2a and 2c, Figure 1) to help qualify the
22 randomized controlled trial (study 3a, Figure 1) of the WALK-Cph project. The intervention is
23 based on an assumption that by tailoring the intervention to the local context the likelihood of a
24 successful implementation will increase (18,26). This will be done by developing and co-designing
25 the intervention in collaboration with key stakeholders such as patients, relatives, health
26 professionals and researchers, in accordance with the BMJ campaign “Partnering with patients”
27 (http://www.bmj.com/company/qip_examples/partnering-with-patients/). A tailored intervention is
28 defined as an intervention in which the identification of barriers has been undertaken before the
29 design and delivery of the intervention (18).
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36 The design of the intervention was inspired by the Medical Research Council (MRC) framework for
37 the development and evaluation of complex interventions to improve health (21). However, instead
38 of first conducting an intervention study to ascertain clinical effectiveness and then, considering
39 implementation, WALK-Cph is designed both as an intervention and an implementation study, a so-
40 called Hybrid Design (27). This means that the implementation study is planned from the outset of
41 the project. Hybrid Design has been advocated to improve the speed of generating new knowledge
42 and to increase the benefit and uptake of clinical research (27).
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46 In four studies, we will design (Phase 1), fidelity-test (Phase 2), impact-test (Phase 3) and measure
47 adoption (Phase 4) of the intervention (Figure 1). Following an initial observational study, the
48 health professionals from two intervention departments will be asked to participate in workshops
49 and focus group interviews during the full study period (Figure 1).
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52 In order to achieve the overall project aim, the following research questions will be addressed in the
53 qualitative studies of WALK-Cph:
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- 4 1. Which cultural practices exist for mobility of older medical patients in the medical departments?
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- 7 2. What are the roles of different professional cultures both regarding mobility of older patients and
- 8 regarding collaboration between different professional groups to achieve increased mobility in older
- 9 patients during and after hospitalization?
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- 11 3. How can we develop a patient intervention that is tailored to local cultural practices and based on
- 12 a high degree of user-engagement by health professionals, patients and their relatives?
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- 15 4. How does a tailored patient intervention influence the extent to which health professionals and
- 16 patients adhere to recommendations for managing increased mobility in older patients during and
- 17 after hospitalization?
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20 **Study setting**

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22 WALK-Cph will be carried out in Denmark where the health care system is publicly funded by the
23 tax payers. The Danish welfare state provides free treatment for primary medical care, hospitals,
24 and home-based care services for all citizens. WALK-Cph will be conducted at six medical
25 departments in three public hospitals in the Capital region of Copenhagen, Denmark. In addition,
26 physiotherapy departments, a municipality and a municipality-based rehabilitation center will
27 participate.
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31 WALK-Cph will use a purposeful sampling approach (28) to reflect the diversity in medical
32 specialties and to obtain rich information concerning the mobility practice in medical patients. We
33 will select departments that reflect many facets of the medical specialty rather than focusing on one
34 specialty. Based on this, we will include medical departments where older medical patients are
35 admitted and where increased mobility is expected to be one of the core tasks of care and treatment.
36 Six different departments will be chosen to participate: 1) a department of endocrinology; 2) a
37 department of infectious diseases; 3) a department of pulmonary diseases; 4) a department of
38 gastroenterology; 5) a general medical department; and 6) an emergency department. Each chosen
39 department will have between 18-40 beds with similar numbers and proportions of physicians,
40 registered nurses and certified nursing assistants. In all hospitals, the physiotherapy service is
41 centrally organized to service all wards.
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45 **Qualitative methods**

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48 The qualitative methods will include an ethnographic field study (comprising participant
49 observation and interviews) and workshops to provide in-depth relational knowledge for designing
50 an appropriate patient intervention (20) and for obtaining knowledge about the contextual
51 circumstances with regard to the implementation, delivery and evaluation of the intervention. These
52 methods, will enable us to account for the context in which events occur and uncover social
53 patterns, for example which relationships are important for actions related to mobility and for
54 interventions that increase mobility. Qualitative methods are also valuable in exploring the
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4 underlying assumptions in relation to the designed intervention and in identifying the so-called
5 active ingredients of a complex intervention (18) aimed at increasing mobility. Finally, the use of
6 qualitative studies make it possible to determine which groups of participants are most likely to
7 respond positively to the designed intervention, and whether the intervention must be modified in
8 different ways for different groups or departments (20,21,29).
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10 11 **Ethnographic field study** 12

13 The design phase (Figure 1) will begin with an ethnographic field study including participant
14 observation and interviews (29–31). Our position will primarily be observant rather than
15 participating (32). The field study will enable us to generate rich descriptions of the interactions
16 between health professionals and patients and explore the importance of contextual factors,
17 professional identities and professional boundaries for mobility of older medical patients in the
18 departments. This is crucial since observational knowledge relating to mobility of older medical
19 patients in the departments is sparse. By being physically present in the departments, taking part in
20 and observing the health professionals carrying out their daily activities, we will be able to
21 understand how mobility of older patients is practiced in the departments and how it is perceived
22 by different participants (29).
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27 We have chosen a focused observation strategy (28,33), whereby we will follow the health
28 professionals (physiotherapists, nurses, nursing assistants and physicians) in their daily work with a
29 particular focus on language, actions and materialities regarding mobility of patients. We will
30 inquire into what is being done and into arguments for decisions that the health professionals make
31 about mobility in concrete situations. We expect to follow between 60 and 80 health professionals
32 depending on staffing on the days of observation and depending on who is involved in mobility of a
33 given patient.
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37 The observations will be carried out by the researchers, two of whom are trained nurses (Msn)
38 while two are trained physiotherapists (MHSc). By choosing researchers with different professional
39 backgrounds, we acknowledge that the ability to gather data and generate knowledge depends on
40 the position of the researcher (32,34). However, we anticipate that by comparing our observations,
41 we will become aware of our own positions and perspectives and how they frame our observations.
42 Thus, by cross-checking and discussing our observations, we can sharpen our attention on
43 differences of significance for data generation. This process will take place continuously during
44 meetings after each observation period to cross-check data and interpretations and will strengthen
45 the validity of the results (33). By systematizing the observations and creating transparency the
46 observations will ascertain credibility (29,35) and enable exploring and understanding of how
47 health professionals make decisions about mobility in interaction with the patients and each other.
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52 We will use an observation guide to record activities and interactions (Appendix 1). Field notes will
53 consist of observations of both non-verbal and verbal aspects such as body language, dialogue
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4 between the health professionals and patients, and the use of material artefacts such as mobility
5 aids. Dialogues will be written down as close to verbatim as possible (36).
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8 The observation guide will also include descriptive data (e.g. sex, profession and professional
9 experience) and questions like “Who initiated mobility?”, “Which arguments are raised when
10 patients’ needs for mobility are rejected or accepted?”, “Is any kind of material artefact used, such
11 as a walker or a screening tool?” According to Mason (37) field notes should also include focus
12 areas of “subjective capabilities”. The intention is that the researcher writes down reflections on his
13 or her own actions, attitudes, location and presence. This increases the understanding of how the
14 researchers affect the relations, underscoring that neutrality and detachment in relation to data
15 collection, analysis and interpretation is impossible.
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18 **Analytical perspective**

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20 We will analyze our observational data using different theories: cultural learning processes and
21 cultural historical activity theory (34,38). These theories can help us understand barriers and
22 transformations in the interaction between the health professionals, structures and artefacts. Also, it
23 can help us understand how the culture creates ideas about how participants, for example the
24 nurses, should interpret and act in relation to mobility in the department(34).
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28 WALK-Cph derives its concept of culture from the theories of cultural learning processes that
29 understand culture not only as a homogeneous set of assumptions, attitudes and values that all
30 health professionals possess (36–38). Rather, culture is understood as something the health
31 professionals produce in order to create links and connections between materialities and meanings
32 in social and physical spaces (29,34). This means that culture does not refer to cognitive processes
33 only (39–41), culture is also enacted and have bodily elements embedded. This concept of culture is
34 relevant when we use observational studies, where we can observe how the health professionals act,
35 what they say, what materialities they include and exclude in their professional practice and how
36 they move in physical rooms. In this perspective, the concept of culture focuses both on what is
37 homogeneous and what is different, for example between professions (23).
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42 Data from the ethnographic field study will be analyzed using both a thematic analysis and a
43 deductive approach where we will analyze the material from the perspective of different theoretical
44 concepts, e.g. as cultural models (23), and activity systems (38).
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47 The results from the analysis will be presented and used as mirror data in the subsequent workshop
48 (Figure 1). Mirror data are defined as data representing the present state of work practices and these
49 data provide the health professionals with a mirror reflection of their activities by presenting
50 examples of current practice (42).
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53 **The workshops**

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4 After the field study, four workshops of four hours will be used to develop the WALK-Cph
5 intervention in collaboration with health professionals, patients, relatives and researchers. In the
6 workshops, we will get an opportunity to bring together different forms of evidence-based
7 knowledge, both theoretical and empirical, to accommodate increased mobility of older medical
8 patients (38). Furthermore, the workshop method is chosen because implementation research points
9 to the importance of involving the persons who are responsible for increasing mobility of older
10 medical patients, in this case the health professionals (26). Each workshop will be held in a
11 classroom in the hospital and will be video- and audiotaped. The design phase consists of three
12 workshops, which are described below.
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15 16 Workshop I: Health professionals.

17 Health professionals from the intervention departments and the municipality will participate. The
18 aim of this workshop is to develop a catalogue of initiatives that the health professionals believe
19 will increase mobility of older medical patients. The catalogue will be based on the health
20 professionals' knowledge, experience and attitudes as well as the observational data from the field
21 study. The proposed initiatives will form the basis for the development of the intervention
22 (Appendix 2).
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25 26 Workshop II: Patients and relatives.

27 Patients and their relatives will participate. Workshop II has two aims: First, to generate a catalogue
28 of initiatives that the patients and the relatives believe will increase mobility, based on their
29 knowledge, experience, attitudes and mirror-data. Second, to obtain feedback from the patients and
30 their relatives on the catalogue of initiatives suggested by the health professionals at workshop I.
31 The initiatives suggested by patients and relatives also contribute to the development of the
32 intervention. The results from workshop II are weighted as much as the results from workshop I.
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35 36 Workshop III: Health professionals.

37 Health professionals will participate and be introduced to the patients' and the relatives' proposals.
38 The particular aim of workshop III is to finalize a prototype of the intervention. Hereafter, a study
39 focusing on facilitators and barriers (barrier screening) will be performed and the intervention will
40 be adjusted according to the results of the barrier screening and afterwards be tested in a feasibility
41 study (Study II, Figure 1).
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44 Following the design phase, an additional workshop will be conducted.
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46 47 Workshop IV: Health professionals, patients and relatives.

48 Health professionals, patients and relatives will participate to provide feedback on the proposed
49 intervention. The aim of workshop IV will be to adapt and design the final intervention which will
50 be tested in the fidelity study (Figure 1) and subsequently in the RCT study
51 Between the different workshops, the research team will work systematically to develop the
52 intervention based on the five-phase model for design of interventions: 1) problem analysis and
53 project planning, 2) information gathering and synthesis, 3) design, 4) pilot testing and 5)
54 evaluation (43). As a part of the workshops and the barrier screening, input from health
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professionals, patients and relatives will be collected and the research team will score the feasibility of all incoming input based on a number of criteria: rationality, complexity, compliance with rules and regulation, required time, economical neutrality, accessibility of equipment and amelioration of patient life quality. Inspired by the Delphi method (44) all input will be scored between 1 and 5, where 1 represents low complexity and 5 represents high complexity. For example: if the intervention proposal is less complex, the score will be 1 to indicate low complexity. All interventions that have a median score equal to or below 2 will be included in the final intervention.

The participants

The participants in workshops II and IV will be 8-10 older medical patients (+ 65 years) who have been admitted to a medical department and 8-10 relatives who have had a relative, friend or family member (+65 years) admitted to a medical department. Further, the participants in workshop I, III and IV will be physicians, nurses and nursing assistants, physiotherapists, occupational therapists and managers affiliated with the two intervention departments or the municipalities. The health professionals will be selected by their managers and will be selected both by profession, experience in the medical or physiotherapy department and for being responsible for the implementation of the intervention. The selection will range from enthusiastic people who are good at initiating and managing interventions, even beyond their own department, to those who have a strong voice within the department and finally, those with the greatest resistance towards the intervention (45). This complexity of participants ensures a multi-voiceness perspective (42) on both possibilities and barriers in relation to designing an intervention that has the ability to match the local context.

Barrier screening

A barrier screening designed as semi-structured individual interviews with health professionals will be carried out in the two intervention departments, the physiotherapy departments and the municipalities after the intervention has been designed. The aim of the barrier screening is to explore and understand the health professionals' perceived barriers and facilitators regarding the intervention, once it has been designed (Figure 1). The barrier screening will complement the field studies at the organizational level and the workshops at the group level. To ensure that the intervention is based on opinions, attitudes and perspectives from health professionals with positions other than those who participate in the workshops, 20 interviews with health professionals will be conducted. Both contradictory and complementary views are relevant for identifying patterns in the participants' understanding, practices and how they relate to situations involving mobility of older medical patients.

The barrier screening will be designed and analyzed based on The Theoretical Domain Framework (TDF) (46,47) and Rogers' framework of innovation attributes (45). The purpose of the TDF is to identify determinants at an individual level. Rogers' innovation attributes concern a number of perceived characteristics of innovations, which influence their adoption and use. Interventions that do not meet these criteria tend to be difficult to disseminate and implement. WALK-Cph is premised on the assumption that an intervention that is developed with contributions from the

perspective of the users and is adapted to the local context is more likely to be implemented (48) .

ETHICS AND DISSEMINATION

Before undertaking observations, interviews and workshops all participants will be informed about the aim of the study. They will be assured that participation is voluntary and that results will be anonymous. All participants will be asked to provide their written, voluntary and informed consent before participation in the workshops and interviews. Anonymity will be ascertained by assigning each participant with a code in the field notes and interviews. Only persons who are part of the research team will have access to data. The project will adhere to the directives of the Helsinki Declaration (49). Ethical approval was not required for the study since formal ethical approval is not mandatory for studies that do not involve biomedical issues (I-Suite no: 05078) according to Danish law.

After completing the study, the results will be disseminated to all the health professionals, managers, patients and relatives. They will be invited to afternoon meetings where the findings, the process and cooperation will be in focus. The results from the study will be published in peer-reviewed scientific journals and presented at one or more scientific conferences.

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25 Figure 1. WALK-Cph intervention and implementation activities (contents covered by the present
26 protocol are in red).
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Figure 1: WALK-Cph intervention and implementation activities (Contents covered by the present protocol are written in red).

	Phase 1: Design		Phase 2: Fidelity		Phase 3: Intervention	Phase 4: Adoption
WALK-Cph intervention grant number [00013449]	Collaborative design of intervention (Study 1a) Practice observation study: Observations of everyday practice to understand the context Intervention design study: Workshops I-III with users and researchers to design the intervention Intervention determinant study: Focus group interviews to identify barriers and facilitators for the planned intervention		Fidelity of intervention (Study 2a) Observational study to measure fidelity of the intervention	Redesign of intervention (Study 2c) Workshop IV with users and researchers for further development and refinement of the intervention	Effect of intervention (Study 3a) Randomized Controlled Trial: To measure effect of the invention Fidelity of intervention: Observations to assess delivery of intervention	
	WALK-Cph implementation grant number [00017276]	Design and development of implementation strategy to support the intervention (Study 1b) Implementation strategy design study: Workshop with users (managers and key implementation staff) and researchers to identify select and monitor relevant implementation strategies.		Fidelity of implementation strategies (Study 2b) Observational study to measure fidelity of implementation strategies.	Redesign of implementation strategies (Study 2d) Workshop with users (managers and key implementation staff) and researchers to re-design and monitor relevant implementation strategies based on the fidelity study and workshops.	Fidelity of implementation strategies (Study 3b) (in case of redesign following 2d) Observational study to measure fidelity

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Appendix 2: QUESTIONS FOR WORKSHOP I – HEALTH PROFESSIONALS IN THE HOSPITAL

1. What do you think of what you have heard - both regarding the preliminary analyzes of accelerometer data and the preliminary data from the observations? What had made the biggest impression on you? And why? (about 10 minutes).

Data from the observation study show that nurses and doctors do not perceive mobilization as part of the treatment for. Therapists' perceived mobilization / physical activities as part of the treatment, but prioritized respiratory physiotherapy and rehabilitation plans over mobilization (about 10 minutes).

2. What do you think your core task is? And does mobilization fit in your core task?
3. What is needed for mobilization and training to be perceived as and becoming an integral part of treatment for all groups?
4. What are the possibilities for supporting physical activity in patients during hospitalization? In answering this question, we would ask you to consider the following points:
 - The possibilities for interdisciplinary cooperation
 - The possibilities for cross-sectoral cooperation
5. During the observation study, you mentioned that physical space is central to mobilization. Despite this, we did not see that they were used extensively.

What is needed for the physical space to be used - whether large, small or the hallway?

6. What concrete ideas might work in your department? Please include the following in your discussion:
 - Standardization of mobilization, e.g. as in fast track of surgical patients
 - The use of e.g. "lung paths" or coffee gymnastics
 - The use of verbal communication from both nurses, doctors and therapists - performing motivational conversation
 - The use of self-training

QUESTIONS FOR WORKSHOP I – STAFF IN THE MUNICIPALITY AND IN THE MUNICIPALITY-BASED REHABILITATION CENTER

7. Are there any differences between professions in relation to mobilization of patients in the municipality? How do these differences appear? And what is the consequence of these differences? (about 10 minutes).
8. Which interdisciplinary cooperation exists in the municipality regarding mobilization and training of citizens? (about 10 minutes).
9. How do you work to support citizens who have been hospitalized to return to previous activity levels (both in the municipality and in the municipality-based rehabilitation center) (about 10 minutes)?
10. What are the possibilities of supporting physical activity in patients during hospitalization? In answering this question, we would ask you to consider the following points:
 - The possibilities for interdisciplinary cooperation
 - The possibilities for cross-sectoral cooperation
11. In addition to the above questions, we would like you to discuss concrete ideas for how a municipal effort could be implemented? Please include the following in your discussion:
 - The use of welfare technology solutions - like motivational SMS messages and "screen training"
 - The use of verbal communication from both nurses, doctors, and therapists - performing motivational conversation
 - The use of self-training